

## HF Series

# NovoVellum® HFU01

The proven solution for improved moisture and electrical resistance compared to conventional EVA encapsulants. Combining the best module sealing capabilities with added power-supporting functionalities.

Featuring a unique patented formulation, NovoVellum® HFU01 is a transparent front-encapsulant with a low UV cut-off. Allowing a broader UV transmission window improves the power output of modules. Insensitive to extreme PID stress.

| Property features                        | Test method         | Unit                      |                          |
|--|---------------------|---------------------------|--------------------------|
| Thickness sheet                          |                     | µm                        | 200 – 1100               |
| Width sheet                              |                     | mm                        | Up to 1450               |
| Core inside diameter                     |                     | mm                        | 76 or 152                |
| Surface finish                           |                     |                           | Matt, rough or polished  |
| Packaging                                |                     |                           | Aluminium bag            |
| Interleaving foil                        |                     |                           | 20µm HDPE, optional      |
| Uncured properties                       | Test method         | Unit (caliper 460 µm)     |                          |
| <b>OPTICAL PROPERTIES</b>                |                     |                           |                          |
| Integrated transmission 400 – 800 nm     | In house method     | %                         | 86                       |
| Maximum transmission                     | In house method     | %                         | 87                       |
| UV cut-off                               | In house method     | nm                        | 300                      |
| <b>MECHANICAL PROPERTIES</b>             |                     |                           |                          |
| Modulus                                  | ISO 527-3           | MPa                       | 50                       |
| Nominal strain at break                  | ISO 527-3           | %                         | > 350                    |
| Tensile stress at break                  | ISO 527-3           | MPa                       | 5                        |
| Hardness Shore A                         | DIN 53 505          | -                         | 65                       |
| Shrinkage                                | On glass            |                           |                          |
| 130°C                                    |                     | %                         | 0.0                      |
| 140°C                                    |                     | %                         | 1.0                      |
| 150°C                                    |                     | %                         | 2.5                      |
| <b>OTHER PROPERTIES</b>                  |                     |                           |                          |
| Normalized water vapor transmission rate | ASTM F1249          | g.mm/(m <sup>2</sup> day) | < 1.5                    |
| Density                                  |                     | g/cm <sup>3</sup>         | 0.95                     |
| Cured properties                         | Test method         | Unit                      |                          |
| <b>ELECTRICAL PROPERTIES</b>             |                     |                           |                          |
| Dielectric strength                      | ASTM D149-09 meth A |                           |                          |
| Dielectric strength                      |                     | MV/m                      | > 40                     |
| Breakdown voltage                        |                     | kV                        | > 15                     |
| DC resistance of insulating materials    | ASTM 257-07         |                           |                          |
| Volume resistance                        |                     | Ω                         | > 4 x 10 <sup>12</sup>   |
| Volume resistivity                       |                     | Ω cm                      | > 1.5 x 10 <sup>15</sup> |
| <b>OTHER PROPERTIES</b>                  |                     |                           |                          |
| Adhesion to glass                        |                     | N/cm                      | > 40 *                   |

\* Value function of cure conditions.

